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14. ABSTRACT

The Joint Test and Training Capability Assessment (JTTCA) project is sponsored by the OSD Central Test and Evaluation Investment Program. The JTTCA project has two main objectives: assess the Joint Tactical Combat Training System (JTCTS) for T&E applications, and assess the DoD High Level Architecture (HLA) for T&E applications by enabling interoperability among open-air range (OAR) assets and with a T&E simulation running in an Installed System Test Facility (ISTF).

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APPLICATIONS

- **HLA ISTF/OAR Integration**
- **Assessment of Training Systems for T&E**
- **Real-Time HLA Mission Support**
- **HLA Tool Evaluation and Development**

The Joint Test and Training Capability Assessment (JTTCA) project is sponsored by the OSD Central Test and Evaluation Investment Program. The JTTCA project has two main objectives:

- Assess the Joint Tactical Combat Training System (JTCTS) for T&E applications.
- Assess the DoD High Level Architecture (HLA) for T&E applications by enabling interoperability among open-air range (OAR) assets and with a T&E simulation running in an Installed System Test Facility (ISTF).

BACKGROUND:. JTCTS is a Navy-led, joint Air Force/Navy program for the development of fixed, transportable, and mobile range instrumentation for shore-based tactical air crew training and for deployable, at-sea naval expeditionary force training. JTCTS is an Acquisition Category II and OSD special interest program. JTCTS will enhance combat proficiency by providing state-of-the-art rangeless training, with the ability to measure performance and effectiveness on every training event. JTCTS is built around a very advanced and powerful instrumentation data link (IDN). As a training system, JTCTS uses this communication net and Global Positioning System (GPS) to track participants and permit mock-combat using simulations to ascertain in real-time the results of dry-fire weapons engagements. JTCTS is specially designed to be a distributed simulation system, enhancing the live play by injecting synthetic maneuvering players or fixed threats such that a coherent virtual overlay to the actual tactical picture can be presented to all live players. The key design feature that gives JTCTS tremendous utility in the live training environment is its very versatile, software-controlled IDN/processor/memory package (a Participant Instrumentation Package (PIP)), either internally mounted or pod mounted) that can be interfaced directly to platform data buses.

JTTCA PROJECT DESCRIPTION: The JTTCA project will assess the capabilities of JTCTS to support open-air range test and evaluation of weapons systems. The project will test JTCTS instrumentation, modified for testing and referred to as the 'JTTCA Core,' with an HLA interface to other T&E systems. It will (1) provide insight into JTCTS utility for T&E application, and (2) test HLA for interoperability within a range. JTTCA will exploit the JTCTS capabilities to interface with the aircraft data buses to stimulate and monitor the system under test. The JTTCA core system could be reusable at other T&E ranges, and the HLA interface developed by JTTCA could be reusable at tactical training ranges as part of JTCTS.
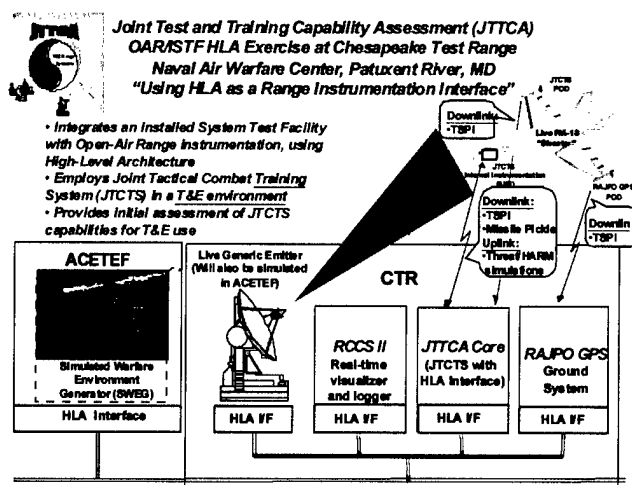

Figure 1. JTTCA Federation

The JTTCA Core will be federated with four T&E range systems located within Atlantic Ranges and Facilities, Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, MD. The systems are physically located at the

Atlantic Test Range (ATR) OAR, and at the Air Combat Environment T&E Facility (ACETEF).

After JTTCA federation integration testing is completed, the JTTCA Federation will be executed by conducting a live open-air range assessment exercise (LOAE). Data from JTTCA federation integration testing, the LOAE, and JTCTS testing conducted by the JTCTS program will be analyzed to assess the performance and applicability of JTCTS for conducting T&E of airborne weapons systems. The results of the analyses will be published in a JTTCA Assessment Report (JAR).

Figure 2. JTTCA Live Open-air Range Exercise

In the JTTCA LOAE scenario, the ACETEF Synthetic Warfare Environment Generator (SWEG) will simulate a generic threat emitter, and via the HLA interface, pass emitter interaction parameters to the JTTCA core. The JTTCA Core uplinks these parameters to the JTCTS Airborne Instrumentation Subsystem - Internal (AISI) on an F/A-18. The generic emitter simulation running in the AISI will process these parameters and provide stimulation to the F/A-18's Radar Warning Receiver (RWR). The RWR will display the presence of this simulated threat in the same manner as with real emitters. The aircrew will observe the threat indication and take appropriate action to launch a simulated High-Speed Anti-radiation Missile (HARM). The AISI will monitor the F/A-18 avionics bus for the missile launch command and relays the weapon "pickle" (launch signal) to the JTTCA Core via the JTCTS data link. The JTTCA Core sends the

weapon pickle to the SWEG via the HLA interface. The SWEG runs the generic threat emitter/HARM engagement simulation and determines the results of the engagement. The entire scenario is visually displayed in real time on ATR's Range Computation and Control System (RCCS II) displays.

The development of the JTTCA federation is being accomplished using tools obtained from the DoD Defense Modeling and Simulation Office (DMSO). The Federation Development and Execution Process Model (FEDEP), Version 1.3, is being used as a guideline in developing and executing the JTTCA federation. Federation development tools from DMSO are being used as well, including the Object Model Template (OMT) and Object Model Development Tool (OMDT). Lessons learned from the use of these tools and from the building and execution of the JTTCA federation will be published within the JAR.

The JTTCA project is being conducted in close coordination with the OSD Foundation Initiative 2010 (FI2010) CTEIP project. For FI2010 information, see http://fi2010.jcte.jcs.mil/.

FUTURE PLANS: At the completion of the JTTCA project, NAWCAD's ATR will have gained an interoperational capability to conduct future T&E and training exercises using the HLA, and will add JTCTS to its instrumentation capabilities for use in T&E and training projects and exercises. The HLA interfaces being developed by JTTCA are reusable at other ranges and facilities, and will be provided to them for reuse upon request. The JTTCA team will be available to assist other ranges and facilities in their implementation of HLA.

Technical Information Point of Contact:

    Mike Payne – Ph (301) 342-1182

Project Director:

    Jim Gill – Ph (301) 342-1228

E-Mail – mailto:payneml@navair.navy.mil